UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,790	12/04/2001	Jan-Mark Geusebrock	JAB-1510	5797

45511 7590 05/21/2007

WOODCOCK WASHBURN LLP
CIRA CENTRE, 12TH FLOOR
2929 ARCH STREET
PHILADELPHIA, PA 19104-2891

EXAMINER	
ROSARIO, DENNIS	
ART UNIT	**PAPER NUMBER**
2624	
MAIL DATE	**DELIVERY MODE**
05/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/009,790	GEUSEBROEK, JAN-MARK	
	Examiner	Art Unit	
	Dennis Rosario	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment was received on 4/18/07. Claims 1-28 are pending.

Response to Arguments

2. Applicant's arguments on page 3 of the REMARKS filed 4/18/07 have been fully considered but they are not persuasive and states:

"The 'filter array'...of Ortyn...is **not** a digital gradient filter"

Regardless whether this statement is true, a Broadest Reasonable Interpretation (MPEP 2111) ought to be applied to determine if the statement is true. The examiner suggests to the applicant to explicitly define the claimed "digital gradient filter".

Note that the applicant has described the digital gradient filter in the REMARKS as "a specific type of high-pass filter that combines smoothing and differentiation on the image data" on page 6,last line to page 7, line 1,2. If applicant provides an explicit definition of the claimed "digital gradient filter" as just described, then the examiner will give patentable weight to "one pass" as discussed in paragraphs 7-11, below, since the digital gradient filter has the capability to perform high-pass filtering, smoothing and differentiation during an "applying" step in claim 1. In addition page 7, lines 13-15 define the digital gradient filter as "a mathematical function which includes both a differential operator and the smoothing operator." or one of "convolutional filter...recursive filter...morphological filter" on page 8, lines 21-29 or "Gaussian curve" in page 12, line 11. If the applicant requests that the examiner interprets the claimed digital gradient as a mathematical function that includes both a differential operator and the smoothing operator and one of said filters or Gaussian curve and not as any filter, please indicate a definition of the claimed "digital gradient filter" so that the Broadest Reasonable Interpretation can be applied.

3. Applicant's arguments on page 3 have been fully considered but they are not persuasive and states:

"...the Ffk array is misunderstood...as being the focus filter..."

Please elaborate upon this statement since the word "focus filter" was not used in the office action of 10/18/06.

4. Applicant's arguments on page 3 have been fully considered but they are not persuasive and states:

"The filter array Ffk of Ortyn...acts on the focus scores, and is **not** used to obtain the focus scores..."

The examiner respectfully disagrees since a plurality of focus scores are obtained are different stages and col. 20, line 62: "array of focus scores FS" corresponds to a second stage of obtaining focus scores while col. 19, line 67: "filtered focus scores" is a first stage of obtaining a focus score.

5. In response to applicant's argument on page 3 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...smoothing after the focus score has been determined." And "...the smoothing filter...is...applied directly to the image data...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

6. Applicant's arguments, see page 4, lines 3-5, with respect to "array of filters" have been fully considered and are persuasive. Regardless of the examiner's reasoning on page 3 of the office action of 10/18/06. Ortyn teaches a "finite impulse response, low pass filtering" in col. 19, lines 56,67 that is "selected" in col. 19, line 56 and "designed" in col. 19, line 62. Thus, Ortyn suggests to one of ordinary skill in the art of filtering images that a plurality of methods can be used to select and design a filter that can perform finite impulse response, low pass filtering.

7. Applicant's arguments on page 4 have been fully considered but they are not persuasive and states:

> **" '[w]hile such a feature such as the 'combined gradient and smoothing operator which carries out both...operations in one pass' are not claimed....' Applicant submits that this statement is incorrect and that these features are claimed (see...claim 1 which recites 'applying a digital gradient filter...,wherein the digital gradient filtering step includes a smoothing operation..."**

The examine respectfully disagrees since the first statement carries out both operations (gradient and smoothing), while claim 1 claims "applying a digital gradient filter", which corresponds to the gradient operation of the combined gradient and smoothing operator", and wherein "applying" is an active step or verb for the gradient portion of the combined gradient and smoothing operator. There is no corresponding active step or verb for the claimed smoothing operation; thus, "one pass" is not claimed. Claim 1, step 2 is understood as applying a digital gradient filter and the possibility of a smoothing operation could be applied before or after the digital gradient filter is applied: See specification, page 11: 1)-3) that provides various combinations of applying the gradient filter and smoothing operation in various sequences.

Note that applicant is reading material from the specification into the claims: more specifically page 11,lines 19,20 "2) a combined gradient and smoothing operator which carries out both gradient and smoothing operations in one pass." The examiner can show that said "1)" and "2)" can also read into the claimed step 2; however, to practice such procedure is improper. The examiner suggest claiming "a combined gradient and smoothing operator which carries out both gradient and smoothing operations in one pass" so that such a feature is clearly claimed and to clear any other confusion with said "1)" and "3)" that corresponds to the claimed step 2, too.

8. Applicant's arguments on page 4 have been fully considered but they are not persuasive.

"Applicant submits that this 'belief' on the part of the examiner is improper"

The examiner's belief is moot in light of paragraph 7, above.

9. Applicant's arguments on page 5 have been fully considered but they are not persuasive and states:

"Applicant requests that the examiner explain with more clarity his reasoning... and also provide a statutory basis for such a methodology for examining patent claims."

The examiner interprets claim 1, lines 5-7 or step 2 of "wherein the digital gradient filtering step includes a smoothing operation having a settable spatial extent" as intended use since no active step or verb has been associated with the claimed "smoothing operation".

If claim 1 claimed "applying a digital gradient smoothing filter"; or

If claim 1 claimed "wherein step 2 includes applying a smoothing operation" then two filtering operations such as a smoothing operator and a gradient operator can be applied during the claimed step 2 because of the active step or verb of "applying."

The claimed "smoothing operation" is an adjective and noun or a name and not an active step or verb. Thus, the examiner has not found an active step or verb associated with the name of "smoothing operation" in claim 1. So the examiner concluded that the digital gradient filter and smoothing operation are not applied in one pass since only one verb, "applying", is associated with the claimed digital gradient filter and not the claimed smoothing operation.

In another interpretation, of the claimed step 2:

Step 2: applying a digital gradient filter ("low pass filter" in col. 19, lines 54,55) to a least some of the pixel values (fig. 17, num. 906 is a "video line" in col. 19, line 9 which are made of pixels known to one of ordinary skill in the art of video) of the first digital image to obtain a focus score ("focus score" in col. 19, line 67) for the first digital image; wherein the digital gradient filtering step includes a smoothing operation (said low pass filter) having a settable spatial extent (or "designed to be sensitive to size" in col. 19, line 58).

Thus, step 2 is broadly interpreted as applying to pixels a lowpass filter as a function of size to obtain a focus score. Regardless of the claimed digital gradient filter that is used with an additional smoothing operation as described on page 11, sections 1)-3) of the specification, the lowpass filter is performing the same function of the claimed digital gradient filter and that is operating on the claimed pixel values.

10. Applicant's arguments on page 5 have been fully considered but they are not persuasive and states:

"Applicant requests that the examiner... provide a statutory basis for such a methodology for examining patent claims"

The examiner is applying Plain Meaning interpretation (MPEP 2111.01) with respect to the claimed applying. If the applicant wants to redefine the claimed applying as performing at least two actions or verbs, then the "one pass" argument ought to be moot, and the Broadest Reasonable Interpretation will be applied instead of Plain Meaning interpretation. A similar situation appears in paragraph 2, above.

11. Applicant's arguments on page 6 have been fully considered but they are not persuasive and states:

"...Ortyn...is very clear that the filter array does not carry out both operations in one pass..."

Regardless whether this statement is true, "carry out both operations in pass" is not claimed for the same reasons as paragraph 9, above.

12. In response to applicant's argument on page 6, line 13 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...smoothing and differentiation in a single filter step.") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

13. In response to applicant's argument on page 7,line 20 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...first order Gaussian derivative in real-time image driven autofocus system.") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

14. Applicant's arguments, see page 8, lines 5-7, with respect to "filter design" of Ortyn have been fully considered and are persuasive. However, the respective rejection is maintained due to a secondary teaching.

15. In response to applicant's argument on page 8, line 8 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...smoothing filter...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

16. Applicant's arguments on page 8 have been fully considered but they are not persuasive and states:

"Ortyn...does not disclose smoothing with settable size."

The examiner respectfully disagrees since Ortyn discloses "eliminates...elements of the array to eliminate edge effects from the filter." in col. 19, lines 61-63. Thus, the image array size is reduced to prevent the respect filter to produce artifacts at the borders of the respective kernel of the filter when applied to the image.

17. In response to applicant's argument on page 8, lines 22,23 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...noise is already averaged inside the claimed filter before constructing the focus score.") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

18. In response to applicant's argument on page 8, line 28 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...mathematically...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

19. In response to applicant's argument on page 8,line 29 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...afterward energy operator...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

20. In response to applicant's argument on page 9,line 12 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...smoothing step...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

21. In response to applicant's argument on page 9,line 22 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "... 'contrast' filtering...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

22. In response to applicant's argument on page 10, lines 8-16 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...timing methodology..."; "...asynchronously starts capturing images."; and ...adapts to the (more or less random) times at which images are caprured.") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

23. In response to applicant's argument on page 12, line 13,14 that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...claimed combined gradient and smoothing filter...") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Claim Rejections - 35 USC § 102

24. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

25. Claims 1,2,4-12,14-20,22,23 and 25-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ortyn et al. (US Patent 5,841,124 A).

Regarding claim 1, Ortyn et al. discloses a method of autofocus of an optical instrument for viewing an object and having an auto-focusing mechanism, comprising the steps of:

Step 1: acquiring a first digital image (fig. 14, num. 316 receives an image via arrow 310) of the object (Oval shape next to numeral 508.) through the optical instrument (Fig. 14, num. 302 has magnification modes), the first digital image (fig. 14, num. 316) comprising a plurality of pixels having pixel values (The first image is formed from a CCD array of a camera as mentioned in col. 17, lines 48-52.);

Step 2: applying a digital gradient filter ("spectral filter" in col. 19, line 27) to at least some of the pixel values of the first digital image to obtain a focus score (Fig. 13:"FOCUS SCORE") for the first digital image; wherein the digital gradient filtering step includes a smoothing operation (or a "transformation" in col. 19, line 21 from fig. 20 to fig. 21) having a settable spatial extent (Fig. 20, "a" or "b" corresponds to distances that are set using a "size range" in col. 19, line 1.) **(see paragraph 2, "Regarding the first sentence" for another interpretation of the claimed step 2 in the office action of 10/18/06 and paragraphs 7-11 and 16, above)**.

Regarding claim 2, Ortyn discloses the method of claim 1, wherein the spatial extent (Fig. 20, "a" or "b" distance or range is selected filtering as mentioned in col. 19, lines 21-28.) of the smoothing function ("low pass filtering" is used with the filter 540 of fig. 14. as mentioned in col. 19, line 57.) is manually and/or electronically settable (The spatial extent or range is "designed using conventional techniques" in col. 19 , lines 33-36).

Regarding claim 4, Ortyn et al. discloses the method according to claim 1, further comprising:

Step 3: moving the object (Oval shape next to numeral 508 is placed on a slide that is moved for each image signal as mentioned in col. 22, lines 8-14.) relative to the optical instrument (Fig. 14, num. 302 has magnification modes) along the optical axis (Fig. 14 has an optical axis shown by an arrow 110 and another arrow going out of 302.) thereof and acquiring a second digital image (Fig. 14, num. 316 is a camera as mentioned in col. 17, line 63) and a second focus score therefor (The camera of fig. 14, num. 318 is a focus minus camera that obtains focus scores shown in fig. 13 as the F^- curve.) in accordance with the method of steps 1 and 2 (The method of steps 1 and 2 are repeated for additional images of step 3.) ;

Step 4: continue moving the object (Oval shape next to numeral 508 is placed on a slide that is moved for each image signal as mentioned in col. 22, lines 8-14.) relative to the optical instrument (Fig. 14, num. 302 has magnification modes) along the optical axis thereof (Fig. 14 has an optical axis shown by an arrow 110 and another arrow going out of 302.) in the same direction in accordance with steps 1 to 3 to acquire at least three digital images (Fig. 14, numerals 314-318 are three cameras that obtains 1 image each for a total of three images as mentioned from col. 17, line 48 to col. 18, line 5.) and first to third focus scores (fig. 13 as three functions that correspond to the three images which each contain a respective focus score.) associated therewith; and

Step 5: determining from the first to third focus scores (fig. 13 as three functions that correspond to the three images which each contain a respective focus score.) a focus position ("0" on the Z POSITION OF SPECIMEN axis is a focused position as mentioned in col. 16, lines 64-66. Note the "0" position corresponds to two focus signals that are "equal" to each other as mentioned in col. 16, line 66.) for the object (Oval shape next to numeral 508) and moving (The oval shape, which is on a slide, is moved for proper focusing as mentioned from col. 16, lines 62 to col. 17, line 4.) the object (Oval shape next to numeral 508) and/or the optical instrument to this position (Fig. 14, num. 302 has magnification modes).

Claim 5 is similar to claim 4, except for step 3 that is disclosed by Ortyn et al.:

Step 3: determining (Normalizing a function F^- to determine corresponding normalized focus scores.) a first plurality of focus scores (Fig. 13 has a plurality of focus scores for a function F^-.) for the first digital image (fig. 14, num. 316) using the digital gradient filter (Fig. 14, num. 540 has a filter, which is shown in detail in fig. 15, num. 404 which produces the score shown in fig. 13) with a first plurality of spatial extents (The F^- has a plurality of spatial extents as shown by each position from –15 to +15) by applying (The method of steps 1 and 2 are performed for one image to obtain 256 focus minus scores as mentioned in col. 18, lines 32-34.) for each spatial extent (-15 to +15 or 30 spatial extents) the method steps 1 and 2.

Regarding claim 6, Ortyn et al. discloses the method according to claim 1, wherein the optical instrument is a microscope (Fig. 2, num. 510 is a microscope.)

Regarding claim 8, Ortyn et al. discloses the method according to claim 1, wherein the digital filtering function ("low pass filtering" is used with the filter 540 of fig. 14. as mentioned in col. 19, line 57.) is a one (Fig. 13 shows a function that corresponds to the filtering of fig. 14, num. 540 that has one dimension in the "Z POSITION".) or two dimensional function.

Regarding claim 9, Ortyn et al. discloses the method according to claim 1, wherein the digital filtering function ("low pass filtering" is used with the filter 540 of fig. 14. as mentioned in col. 19, line 57.) is a Gaussian function (Fig. 13 shows a normalized function with triangle marks and a corresponding equation in figure 13 that is mentioned in col. 21, lines 1-6 that corresponds to the filtering of fig. 14, num. 540. Note that the specification states that a Gaussian function is "normal Gaussian curve" on page 12, line 2. Thus the normalized function with triangle marks in fig. 13 is a normal Gaussian curve.)

Regarding claim 10, Ortyn et al. discloses the method according to claim1, further comprising the step of selecting the spatial extent (Fig. 20, "a" or "b" distance is selective filtering as mentioned in col. 19, lines 21-28.). of the digital filtering function ("low pass filtering" is used with the filter 540 of fig. 14. as mentioned in col. 19, line 57.).

Claim 11 is rejected the same as claim 1. Thus, argument similar to that presented above for claim 1 of a method is equally applicable to claim 11 of an instrument except for the additional limitation of an auto-focusing mechanism which is disclosed in Ortyn et al.: "autofocus system" in col. 15, line 58.

Claim 12 was addressed in claim 2.

Regarding claim 14, Ortyn et al. discloses the optical instrument according to claim 11, further comprising:

a) a drive device (fig. 1A, num. 526:MOTOR DRIVERS) for moving the object (fig. 16) relative to the optical instrument (fig. 1A, num. 516:IMAGE CAPTURE & FOCUS (ICF)) along the optical axis thereof (fig. 2 is a detail of the ICF of fig. 1A, num. 516 that has an optical axis 110).

Regarding claim 15, Ortyn et al. discloses the optical instrument (fig. 1A, num. 516:IMAGE CAPTURE & FOCUS (ICF)) according to claim 11, the instrument being further adapted for determining from a plurality of focus scores (Fig. 13 has a plurality of focus scores on a vertical axis for three functions, F^-, F^+ and F) for a plurality of images (F^-, F^+ corresponds to two images) a focus position for the object (The function F is the final focused image based on the other two functions).

Regarding claim 16,Ortyn et al. discloses the optical instrument according to claim 15 further adapted for fitting ("normalized" functions of fig. 13 are adjusted to fit in a score range on the vertical axis.) the plurality of focus scores (Fig. 13 has a plurality of focus scores on a vertical axis for three functions, F^-, F^+ and F) to a polynomial function (The function of fig. 133 with square marks.) and determining the focus position (-5 on the Z POSITION AXIS) as a position to a maximum (-5 of the Z POSITION AXIS corresponds to a maximum score of 1 on the vertical axis.) of the polynomial function (The function of fig. 13 with square marks.)

Regarding claim 17, Ortyn et al. discloses the optical instrument (Fig. 1A, num. 516:IMAGE CAPTURE & FOCUS (ICF)) according to claim 15, the instrument being adapted to determine for each image a plurality of focus scores (Fig. 13 has a plurality of focus scores on a vertical axis for three functions, F^-, F^+ and F that correspond to three images.) using a plurality of spatial extents (The function of F^- and F^+ each have a range from –15 to +15 on the Z POSITION OF SPCIMEN axis.) for the digital filter (Fig. 14, num. 540 has a filter shown in detail in fig. 15).

Claims 18 and 25 were addressed in claim 8.

Claims 19 and 26 were addressed in claim 9.

Claim 20 was addressed in claim 6.

Claim 23 was addressed in claim 12.

Claim 22 was addressed in claim 11.

Claim 27 was addressed in claim 15.

Claim 28 was addressed in claim 16.

Claim Rejections - 35 USC § 103

26. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

27. Claims 3,13,21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ortyn et al. (US Patent 5,841,124 A) in view of Hartman (US Patent 4,592,089 A).

Regarding claim 3, Ortyn et al. teaches a method of autofocus for an optical instrument for viewing an object and having an auto-focusing mechanism, comprising the steps of:

Step 1: acquiring a first digital image (fig. 14, num. 316 receives an image via arrow 310) of the object (Oval shape next to numeral 508.) through the optical instrument (Fig. 14, 302 has magnification modes), the first digital image (fig. 14, num. 316) comprising a plurality of pixels having pixel values (The first image is formed from a CCD array of a camera as mentioned in col. 17, lines 48-52.);

Step 2: applying a digital filter ("or filter array" in col. 19, line 53) to at least some of the pixel values of the first digital image to obtain a focus score (Fig. 13:"FOCUS SCORE") for the first digital image; wherein the digital filter is defined by a mathematical smoothing function (or "low pass filter" in col. 19, lines 54,55 that is one component of the filter array)

Ortyn et al. does not teach the remaining limitations, but teaches that the low pass filter can be "designed to be sensitive...to size" in col. 19, line 58. Thus, Ortyn et al. suggests to one of ordinary skill in the art a plurality of teachings that can used to create the low pass filter.

Hartman teaches a low pass filter or "median filtering" in col. 11, line 39 that "removes high-frequency" in col. 11, line 39 or "point noise without boundary smoothing" or "spot radii" in column 8, TABLE II, labels MEDSM and RADFLT that is sensitive to size or a "radius" in col. 11, line 41. Thus, the median filter is interpreted to remove the point noise via a smoothing operation and retain the boundary by not smoothing or removing the boundary) that could be used during the design of the low pass filter and the remaining limitation of:

a) a mathematical smoothing function (or "median filtering" in col. 11, line 39 as shown in column 8,TABLE II, label: MEDSM and RADFLT) having a negative and positive lobe around the origin thereof (via a differential in table II, label: CSDIF that includes an "origin" in col. 10 10, line 33 as shown in fig. 10), the mathematical smoothing function having only one zero crossing (as shown n fig. 10) and being limited in spatial extent (as shown in fig. 3,num. 45) in that it extends over a distance equal to the image size and extends (as shown in fig. 10 to the left and right towards the horizontal axis) at least over three pixels either side of a pixel whose value is being filtered (since fig. 3,num. 45 is a 60 x 60 window in TABLE II, label: WINDIN).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify Hartman's teaching of median filtering with Ortyn et al.'s teaching of a low pass filter, because Hartman's median filter removes "high frequency- and spurri-ous...irregularities" in col. 11, lines 39,40.

Claims 13 and 24 are rejected the same as claim 3. Thus, argument similar to that presented above for claim 3 of a method is equally applicable to claims 13 and 24 of a mechanism.

Claim 21 is rejected the same as claim 12. Thus, argument similar to that presented above for claim 12 is equally applicable to claim 21.

Conclusion

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chen et al. (US Patent 5,710,829) is pertinent as teaching a method of using a filter as shown in fig. 1,num. 30 of which a detailed view is show in fig. 5 that includes measuring focus 51 and smoothing 52.

Kenyon et al. (US Patent 5,317,644) is pertinent as teaching a method of using a GAUSSIAN SMOOTHING FILTER and INTENSITY GRADIENT PRODUCING FILTER as show in fig. 5 and focusing as shown in fig. 4.

Aoki et al. (US Patent 4,300,826) is pertinent as teaching a method of using a SMOOTH-ING CKT. with a DIFFER-ENTIATOR as shown in fig. 1 for focusing as shown in figures 2,5 and 6.

Schlag et al. (Implementation of Automatic Focusing Algorithms for a Computer Vision System with Camera Control) is pertinent as teaching a method of smoothing the function or hill or gradient of fig. 3-7 using Spatial Averaging in section 3.3.1 to obtain the best focus as indicated by the peak of fig. 3-7.

29. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Rosario whose telephone number is (571) 272-7397. The examiner can normally be reached on 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DR

Dennis Rosario
Unit 2624

Matthew C. Bella

MATTHEW C. BELLA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600